

FIG. 2

OPCODE	COMMAND MEANING
00 0000 0000	NO INFORMATION
00 0000 0001	RESERVED
00 0000 0010	PC TRACE GAP
00 0000 0011	REPEAT INSTRUCTION
00 0000 0100	COUNTER START
00 0000 0101	COUNTER OVERFLOW/COUNTER VALUE
00 0000 0110	RESERVED
00 0000 0111	COMMAND ESCAPE
00 0000 1xxx	EXCEPTION OCCURRED
00 0001 0xxx	TIMING SYNC POINT
00 0001 1xxx	MEMORY REFERENCE SYNC POINT
00 0010 xxxx	PC SYNC POINT/FIRST/LAST/TRIGGER
00 010x xxxx	SAME PC
00 011x xxxx	CPU AND ASIC DATA
00 10xx xxxx	RESERVED
00 11xx xxxx	MEMORY REFERENCE BLOCK
01 xxxx xxxx	BRANCH/BEGINNING OF PARAMETER
10 xxxx xxxx	CONTINUE
11 xxxx xxxx	TIMING

FIG. 3

TIMING PACKET EXAMPLES

OPCODE	CYCLE BITS	MEANING
11	00000000	8 CONSECUTIVE CYCLES OF EXECUTION
11	11111111	8 CONSECUTIVE STALL CYCLES
11	11110000	THE RIGHT MOST BITS INDICATE THE PROCESSOR EXECUTED FOR 4 CYCLES AND THEN STALLED 4 CYCLES
11	10101010	THE BITS MEAN EXECUTE, STALL, EXECUTE, STALL, EXECUTE, STALL, EXECUTE, AND STALL RESPECTIVELY

FIG. 4

TIMING SYNC PACKET

TIMING SYNC HEADER	3-BIT PC SYNC ID	

3/10

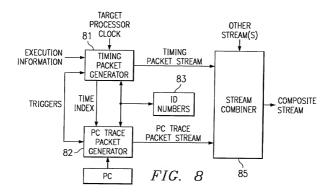
PC SYNC POINT TYPES

TYPE	SYNC TYPE	REASON FOR SYNC POINT
000	TRIGGER	USER DEFINED TRIGGER
001	FIRST POINT	STANDBY MODE
010	SYNC POINT	PERIODICALLY GENERATED
011	FIRST POINT	STREAM ENABLED
100	LAST POINT	STREAM DISABLED

FIG. 6

TIME PC SYNC POINT OPCODE 00 0010 TYPE (3 BITS) RESERVED SYNC ID (3 BITS) 10 RESERVED TIME INDEX (3 BITS) 10 CURRENT LSB 10 PC 10 ABSOLUTE 10 MSB ADDRESS

PIG. 7



TIME

OPCÓDES

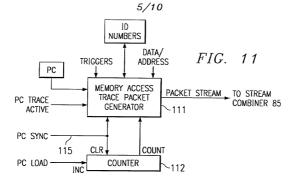
	PACKET	SEQUI	NC	E
	0011	LD/S1 (1 BI1		DATA, ADDRESS, PC (5 BITS)
01	DATA	BYTE	0 ι	SB
10	DA	TA BY	TE '	
10	DA	TA BY	E 2)
10	DA	TA BY	E 3	3
10	DA	TA BY	E 4	
10	DA	TA BY	E 5	>
10	DA	TA BY	ΕŒ	5
10	MSB	DATA I	BYTE	7
01	DATA ADDRESS BYTE 0 LSB			
10	DATA A	DDRES:	SB	YTE 1
10	DATA A	DDRESS	S B	YTE 2
10	MSB DATA	ADDR	ESS	BYTE 3
01	NATIVE PC ADDRESS BYTE 0 LSB			OFFSET, BITS 7-0 (8 BITS)
10	NATIVE PC ADDRESS BYTE 1	OR		OFFSET, BITS 15-8 (8 BITS) (OPTIONAL)
10	NATIVE PC ADDRESS BYTE 2			NOT NEEDED
10	MSB NATIVE PC ADDRESS BYTE 3			NOT NEEDED

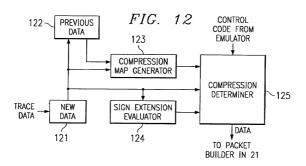
MEMORY REFERENCE SYNC POINT

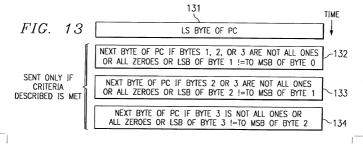
FIG. 9

OPCODE	PARAMETER FIELD (3-BITS)
00 00011	MSB SYNC ID LSB

FIG. 10







СОМ	PRESSION EXAMPLE 0
PREVIOUS DATA	1111111 11111111 1111111 10000011
NEW DATA	#4141/44 11111111 41441114 10000011
COMPRESSION BIT MAP SENT	NONE BECAUSE ONLY ONE BYTE COMPRESSES
SEND BYTES	DROPPED DROPPED DROPPED SENT
	BYTE #0 IS SENT

FIG. 14

СОМ	PRESSION EXAMPLE 1
PREVIOUS DATA	1111111 1111111 1111111 10000011
NEW DATA	并并并并在 11111111 并并并并 10000100
COMPRESSION BIT MAP SENT	NO BECAUSE ONLY ONE BYTE COMPRESSES
SEND BYTES	DROPPED DROPPED SENT
	BYTE #0 IS SENT

FIG. 15

СОМ	PRESSION EXAMPLE 2
PREVIOUS DATA	11101111 11101111 11101111 10000011
NEW DATA	11101111 11101111 11101111 10000100
COMPRESSION BIT MAP SENT	YES BECAUSE NO SIGN EXTENSION AND TWO OR MORE BYTES COMPRESS
SEND BYTES	DROPPED DROPPED DROPPED SENT
	BYTE #0 IS SENT

FIG. 16

СОМ	PRESSION EXAMPLE 3
PREVIOUS DATA	::00001000::01111110::11000011::10000100
NEW DATA	111111111111111111111111111111111111111
COMPRESSION BIT MAP SENT	YES BECAUSE NO SIGN EXTENSION AND TWO OR MORE BYTES COMPRESS
SEND BYTES	DROPPED DROPPED DROPPED
	NO BYTES ARE SENT

COM	IPRESSION EXAMPLE 4
PREVIOUS DATA	10000011 00000100 14111111 11111111
NEW DATA	3431449: 11111111 34141111: 11111111
COMPRESSION BIT MAP SENT	YES BECAUSE TWO OR MORE BYTES NOT COVERED BY SIGN EXTENSION COMPRESS
SEND BYTES	DROPPED DROPPED DROPPED
	NO BYTES ARE SENT

FIG. 18

TIME		
+	00	DATA HEADER190
	10	DATA COMPRESSION MAP BYTE (8 BITS) = 11011001 -192
	01	LSB DATA BYTE 0 (NOT SENT)
	10	Data Byte 1 (Sent)
	10	DATA BYTE 2 (SENT)
	10	DATA BYTE 3 (NOT SENT)
	10	DATA BYTE 4 (NOT SENT)
	10	DATA BYTE 5 (SENT)
	10	DATA BYTE 6 (NOT SENT)
i	10	MSB DATA BYTE 7 (NOT SENT)
	<i>•</i>	
OP(CODES	FIG. 19

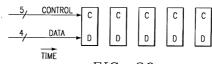
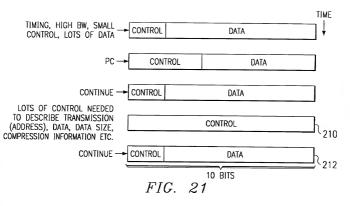


FIG. 20 (PRIOR ART)



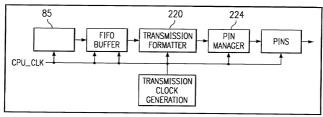
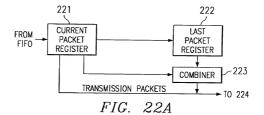


FIG. 22



6 TRACE PACKETS TRANSMITTED AS 10 TRANSMISSION PACKETS												
10		10	T	10			10		10			
6	6	6	6	6	6	6 6		6	6	6		
TIMF →												

FIG. 23

10	10	10	10	10	10	
12	12	1	2	12	12	

FIG. 23A

10	10	10	10	10	10	10	10		
16		16	1	6	16		16		

FIG. 23B

	REGISTER 221										REGISTER 222											
	# CURRENT TRANSMISSION PACKET										# INCOMPLETE TRANSMISSION PACKET											
t	0	9	8	7	6	5	4	3	2	1	0		EMPTY									
İ	1	9	8	7	6	5	4	3	2	1	0	0	9	8	7	6	5	4	3	2	1	0
İ	1	9	8	7	6	5	4	3	2	1	0	1	9	8	7	6	5	4	3	2	1	0
İ	2	9	8	7	6	5	4	3	2	4.:	0	1	9	8	7	6	5	4	3	2	1	0
I	2	9	8	7	6	5	4	3	2	1	0	2	9	8	7	6	5	4	3	2	1	0
Ì	3	9	8	7	6	5	4	3	2	1	0	2	9	8	7	6	5	4	3	2	1	0

FIG. 24

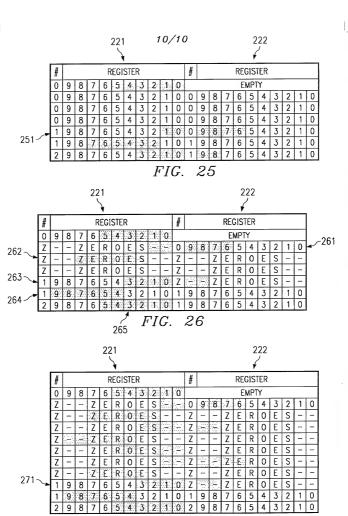


FIG. 27